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UK experience in the promotion of energy efficiency and 'economic dematerialization'

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UK LCS developments

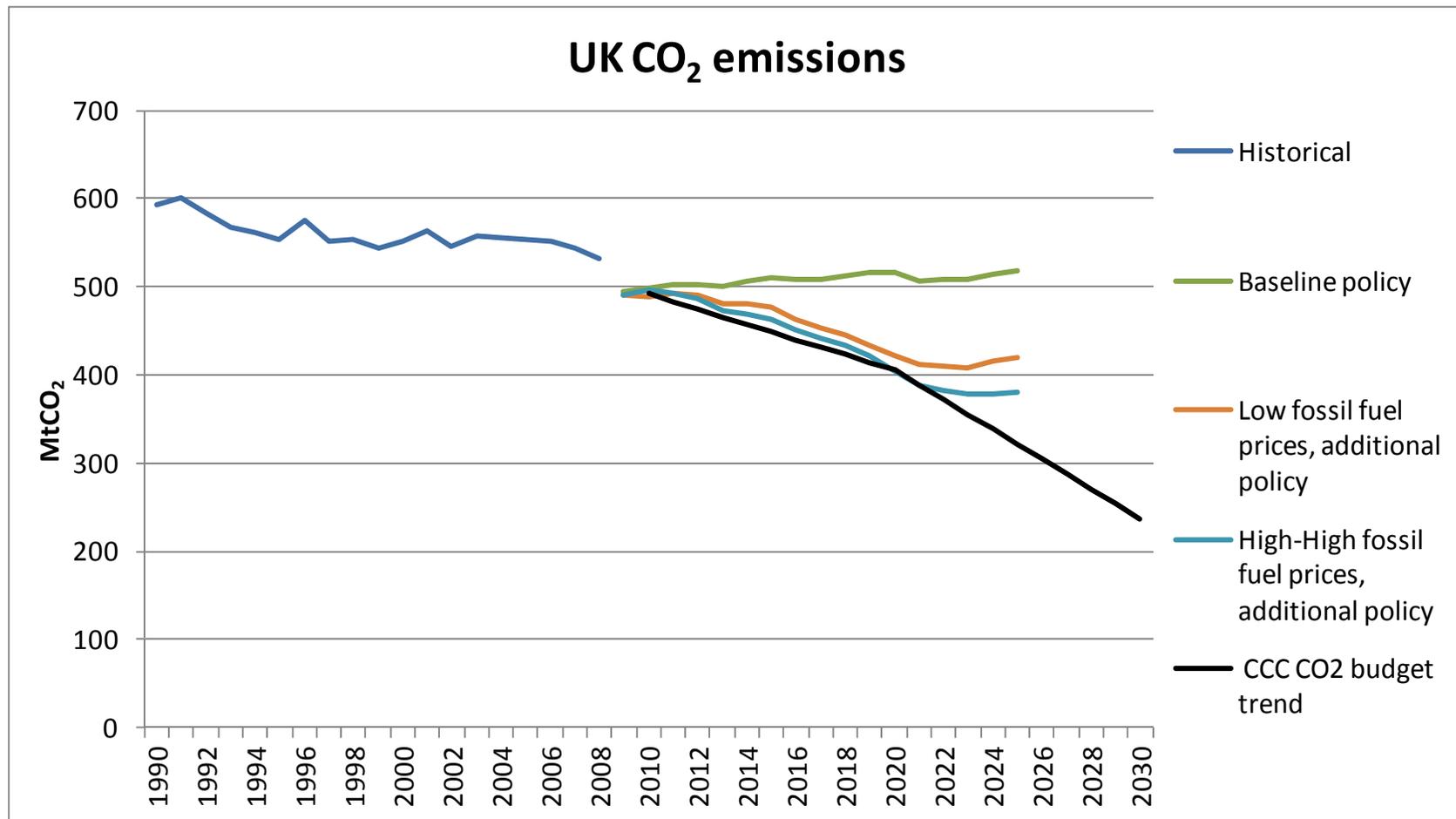
- The UK was first G20 nation to legislate for a low carbon society (LCS)
 - Stringent long-term carbon targets via an 80% reduction by 2050 in greenhouse gas (GHG) emissions (Climate Change Act, 2008)
 - Other key energy policy goals (Energy White Paper, 2007); ensuring a resilient and secure UK energy system, and ensuring equity in access to energy services.
- Continued prioritisation of a LCS
 - “*The transition to a low-carbon economy will be one of the defining issues of the 21st century*”. Foreword to the Low Carbon Transition Plan (2009) by then Secretary of State Ed Milliband
 - Political consensus (Conservative, Labour, Liberal Democrats, Scottish Nationalists) on importance of LCS in May 2010 General Election
- Institutional implementation of UK energy policy goals
 - Department of Energy and Climate Change (DECC)
 - Committee on Climate Change (CCC)
 - UK Research Councils interdisciplinary energy programme
 - UK business via Energy Technologies Institute (ETI)

UK energy policy landscape

Date	Purpose	Policies included
DTI, 1992	General energy sector analysis	Energy efficiency office (EEO)
DTI, 1995	Input into UNFCCC negotiations, nuclear review	EEO, 1994 Climate Change Plan (includes Energy Savings Trust - EST, VAT on fuels)
DTI, 2000	Climate Change Programme and UNFCCC Third National Communication	Energy efficiency best practice, Home efficiency scheme, EST, VAT, renewable obligation (RO) at 10%, climate change levy (CCL)
DTI, 2004	EUETS National allocation plan - phase I, and Climate Change Programme review	Energy efficiency commitment (EEC), buildings regulations, product standards, UK emissions trading scheme (UK-ETS), CCL, RO, Climate change agreements (CCA), Carbon Trust, Transport voluntary agreements
DTI, 2006	Energy Review, and EUETS National allocation plan - phase II	EEC 1 and 2, Home efficiency scheme, Warm front, building regulations, community energy, RO, UK-ETS, CCL, CCAs, Transport voluntary agreements, RTFO, Public sector reductions
BERR, 2007	Energy White Paper	EEC 1 and 2, CERT, Home efficiency scheme, Warm front, building regulations, community energy, RO, Carbon trust, UK-ETS, CCL, CCAs, Transport voluntary agreements, RTFO, 10 year plan, fuel duty escalator, Public sector
DECC, 2008	Climate Change Committee report	As above. Plus: EU emission trading scheme (EU-ETS) at €25/tCO ₂ , CCS demonstration, higher RO, Carbon reduction commitment (CRC), product policy, residential supplier obligation, zero carbon homes
DECC, 2009	Implementation of Low Carbon Transition Plan	Currently being enacted wide range of policies to meet the UK first three carbon budget periods in 2008-12, 2013-17 and 2018-22 (see section 4)
DECC, 2010-2011	Electricity Market Reform and other DECC policy proposals	Electricity market reform (CO ₂ floor price, emissions standard, feed in tariff), Green Deal, Green Investment Bank

UK CO₂ emissions

[Source: Updated Emissions Projection, 2010; plus NAEI and CCC]



UK policy embedded in projections

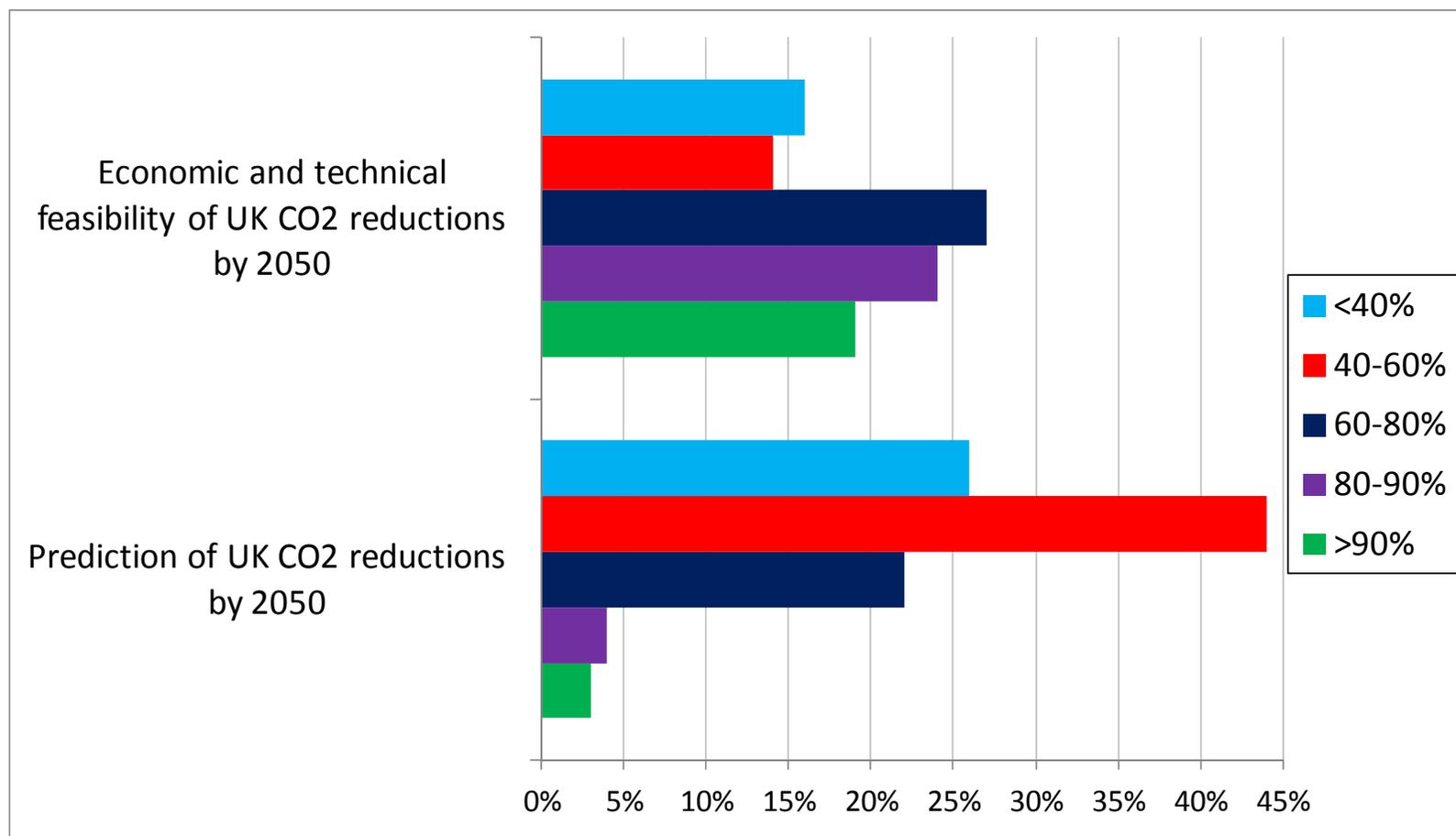
(all in MTCO ₂)										
UEP publication year	2010		2008		2007		2006		2004	1995
	2010	2020	2010	2020	2010	2020	2010	2020	2010	2000
Energy Supply & other			19.8	30.8	19.4	30.8	18.4	18.6	17.9	9.2
Industry / Business			17.2	30.4	17.6	30.4	18.1	28	16.2	9.2
Transport			17.6	45.9	17.6	45.4	16.1	17.2	11	14.7
Residential			2.9	2.9	2.9	2.9	0.4	0.4	1.7	0
Agriculture			2.2	5.5	2.2	5.5	3.6	3.6	3.3	0
Public sector & services			60.4	119.2	60.5	119.9	56.5	67.7	55	33
EU-ETS			24	46	0	0	0	0	0	0
TOTAL	69.6	198.7	84.4	165.3	60.5	119.9	56.5	67.8	55.0	33.0

Controversies in projections

- Impact of economic crisis and recession
- Accounting and impact of policy
 - Ex post verification
- Long-term uncertainties (through 2050)
 - Pricing
 - Innovation
 - Behaviour change
- Availability and usefulness of alternate analytical tools

Expert assessment of long-term UK CO₂ reductions

[Source: UKERC Energy 2050 launch, 2009]



Range of UK LCS analytical tools

- Key UK models
 - Macro-econometric (MDM-E3)
 - Input-output (MRIO)
 - IAM (PAGE 2009)
 - Econometric (DECC energy model – produces UEP)
 - Energy systems optimisation (MARKAL, TIMES, ESME)
 - Accounting (DECC Calculator)
 - Electricity and gas network models
 - Transport simulation models
 - Buildings stock models
- Plus range of scenario exercises

UK energy models: Fit for LCS analysis?

- Decent portfolio of energy models, but...
 - Research funding still small (annual spend of approx £0.8M)
 - Consultancy modelling efforts on uneven private and government projects. Cannot support model improvement, data updating and model maintenance
- Different models = different insights; UK gaps include:
 - Sectoral analysis: notably industry and buildings
 - Global (macro) modelling: flows of capital, technology, resources, emissions credits
 - Characterising uncertainty: via sensitivities, probabilistic inputs, stochastic programming, model structure approaches
 - Understanding behavioural change: e.g. agent based, bounded rationality
 - Broader environmental linkages
- UK cannot free-ride on global integrated assessment models

How much to spend on LCS analytical tools?

- Current extreme pressures on public finances
 - But modelling requires consistent funding required through multi-year anchor projects or organisations
- Possible metrics:
 - Current spend from RCUK plus consultancy around **£1M p.a.**)
 - Same as climate modelling – Hadley Centre funding at **£18M p.a.**
 - Indicative threshold of 0.1% of CO₂ mitigation costs (**£19M p.a.** based on £19.0B to meet twin decarbonisation and energy security goals in 2025; UKERC Energy 2050)
 - Relative to EVPI of key uncertainties (**£2M to £200M p.a.** based on stochastic MARKAL runs; CCC, 2010)

Conclusions

- UK government positioned as a global leader in low carbon policy
- Concern over differences in projections vs. actualisation of LCS policy
 - Policy effectiveness and maintenance of political will
 - Economic dematerialisation, and role of current recession
 - Long term issues of pricing, innovation and behavioural change
- Ongoing underpinning role of LCS modelling and scenarios
 - Particular issue in underfunding of energy modelling for LCS research